GW SAMPLING--Quality control samples for NAWQA microbiology (updated 7/11/03)

Type of sample	Description	Purpose	Frequency of collection	Criteria for acceptance	NWIS data-base information (Questions on coding samples for NWIS can be directed to Jeff Martin)	Comments
Analytical QC--Parameter codes 90900 (total coliforms) and 90901 (E. coli), MI MF agar, col/100 mL						
Filter blank (Filter blank is not stored in NWIS as a QC sample)	Sterile buffered water filtered before processing 100-mL of environmental sample	Determine sterility of equipment and supplies. Measures positive bias in the results for the associated environmental sample.	Every environmental sample	*Reject environmental sample results* If target colonies in filter blank are > 20 percent of target colonies in sample OR If nontarget colonies in filter blank cover the plate, inhibiting growth of target colonies	1. Enter the col/100 mL for the environmental sample into QWDATA. 2. Set the Data Quality Indicator to "Q" (Reviewed and rejected). 3. Set Remark code to "V" (Value affected by contamination). 4. Set Value-qualifier code to "w" (High variability). 5. Enter ONE of these result-level comments: "X Target colonies in filter blank" OR "target colonies inhibited by non-target growth."	Even though sample results are rejected, they are still stored NWIS. We include remark codes and result-level comments in the event that criteria will be changed later.
				Qualify environmental sample results For target colonies, 5 to 20 percent of sample colony count	1. Enter the col/100 mL for the environmental sample into QWDATA. 2. Set Remark code to "V" (Value affected by contamination). 3. Set Value-qualifier code to "w" (High variability). 4. Enter this result-level comment: "X Target colonies in filter blank."	Sample results are qualified in NWIS. We include remark codes and result-level comments in the event that criteria will be changed later. It is, therefore, important to know why QC has failed criteria and by how much.
				Accept environmental sample results For target colonies, < 5 percent of sample colony count	1. Enter the col/100 mL for the environmental sample into QWDATA. 2. Enter this result-level comment: "X Target colonies in filter blank."	
Procedure blank	Sterile buffered water filtered after the sample	Measure the effectiveness of the rinsing technique. Measures negative bias in the results for the previous sample.	Not required			
Positive and negative control cultures (Not stored in NWIS as a QC sample)	Pure cultures analyzed in the same manner as the sample	Ensure the procedure is correctly performed and test the integrity of the media. Measures positive or negative bias in the samples plated on this media. Bias may be temporal (as media ages).	3 for each MAS 2 for each SWQA spread out over the sampling period and age of the media	Will develop criteria with study units in 2002 and 2003. Tentative criteria--for positive control, detect growth; for negative control, no growth *Ohio District will email expected results to study units, and study units will email their results to the Ohio District.*	None at this time. *Ohio District will compile a spreadsheet with results.*	Tests the stability of the antibiotic and ability to discern target colonies. Be sure to do at the beginning and end of medium holding time. Space out evenly over the sampling period. We also recommend an early check, about 2 weeks before sampling begins, especially for those inexperienced in using the method.

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Field QC--Parameter codes 90900 (total coliforms) and 90901 (E. coli), MI MF agar, col/100 mL						
Field blank (Stored in NWIS)	Sterile buffered water handled in the same manner as a sample	Assess contamination of samples from filling the sample bottle and from the bottle itself.	3 for each MAS 2 for each SWQA spread out over the sampling period	Do not qualify individual environmental samples on the basis of field blanks. *Contact Ohio District if contamination is found*	Enter colony count of field blank in QADATA--sample medium is "Q" for qc sample, sample type is "2" for blank, parameter code 99100 is "70" for sterile buffered water $PO_4/MgCl_2$ (lot number is not required), parameter code 99101 is "80" for Ocala, parameter code 99102 is "100" for field	Do not analyze a replicate field blank.
Field replicates (Stored in NWIS)	Sequential replicate samples (two bottles are collected and each bottle is plated once)	Assess analytical and sampling variability	Every sample	Do not qualify individual environmental samples on the basis of field replicates. High variability often is caused by incomplete mixing. *Contact Ohio District if variability is greater than 30 percent.*	Enter colony count of 1st sample in QWDATA--sample medium is "6" for GW, sample type is "7" for replicate, parameter code 99111 is "30" for replicate or "100" for more than 1 type of qc sample, parameter code 99105 is "20" for sequential Enter colony count of 2nd sample in QADATA--sample medium is "S" for GW, sample type is "7" for replicate, parameter codes 99105 is "20" for sequential	Field replicates are done for each environmental GW sample (Each replicate needs it's own filter blank).
Field QC--Parameter codes 99332 (coliphage, somatic, *E. coli* CN13-host) and 99335 (coliphage, F-specific, *E. coli* F-amp host), presence (1) or absence (2) per 1 L						
Field blank	Sterile water handled in the same manner as a sample	Assess contamination of samples from filling the sample bottle and from the bottle itself.	Not required			Coliphage occurrence in ground water is low. If several samples are positive for coliphage (>15 percent of samples), consider adding a field blank. *The study unit should contact the Ohio District about field blanks for coliphage if this occurs.*
Field replicates			Not required			
Laboratory Matrix spike (Not stored in NWIS at this time)	A sequential replicate (6 L needed, 3 L for each coliphage type) sent to the laboratory for spiking	Determine any matrix interference on the analytical method	2 for each MAS 1 for each SWQA	One out of three bottles need to be positive for the sample to be acceptable. Repeat if unacceptable. If unacceptable twice, there may be matrix interference.	Not entered in QC database at this time; *Ohio District will compile a spreadsheet with results.*	For a MAS, do a matrix spike at the beginning of sampling and later when conductance and (or) pH are different than the first time. Matrix spikes should be collected to represent a range of water matrices across the MAS.